REMARKS

The Office Action dated August 9, 2006, has been reviewed carefully. Reconsideration of the rejections is respectfully requested on the basis of the above amendments and the following remarks.

The present invention provides an improved method and associated apparatus for identifying articles of interest by employing a plurality of RF antennas positioned on articles of interest, wherein each RF antenna has a non-linear element associated therewith and wherein each RF antenna is resonant at one of a plurality of different RF frequencies. RF energy of a first frequency is employed to interrogate one of the RF antennas. As a result of the non-linear element, the RF energy of a first frequency is converted into reflected RF energy of a different frequency from the first frequency. The reflected RF energy is sensed and, on the basis of *the difference between the first frequency of the interrogating energy and the different frequency of the reflected RF energy (i.e., by subtracting one from the other)*, a determination is made as to which specific antenna is present on said article. These features are recited in independent method claim 1 and independent apparatus claim 15.

The present invention also provides a method and apparatus for monitoring an ambient physical condition such as temperature, pressure, humidity, chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, among others. In particular, an RF antenna has associated therewith a non-linear element *whose response (i.e., the frequency it will reflect) depends on the physical property being monitored.* RF energy of a first frequency is employed to interrogate the RF antenna. As a result of the non-linear element, the RF energy of a first frequency is converted into a reflected RF energy of a different frequency from the first frequency. Because the response of the non-linear element is dependent on the value of the property being monitored, the value of the different frequency that is reflected will depend on and vary based upon *the physical property being monitored.* By comparing the reflected frequency to the transmitted first frequency, *and in particular by determining a difference between the two frequencies (i.e., by subtracting one from the other),* the level of or changes in the ambient physical property can be monitored. These features are recited in independent method claim 24 and independent apparatus claim 33.

CLAIMS 1-41 – SECTION 103(a)

Claims 1-41 were rejected on the basis of United States Patent No. 4,700,179 to Fancher in view of United States Patent No. 5,731,762 to Gila et al.

Claim 1 recites a method of identifying an article of interest including steps of "interrogating said one RF antenna with RF energy of a first frequency," "converting said interrogating RF energy into reflected RF energy of a different frequency," and "on the basis of a difference between said first frequency and said different frequency determining if a specific said antenna is present." Similarly, claim 15 recites an apparatus for determining if an article of interest is present that includes "an RF frequency generator for directing RF energy of a particular frequency to said antenna," "a detector for receiving RF energy from said antenna," and "a processor for determining from a difference between said reflected frequency and said directed particular frequency whether the antenna is a specific antenna." In rejecting claims 1 and 15 under 35 U.S.C. §103, the Examiner stated that Fancher discloses a method and apparatus for identifying an article of interest wherein one of a plurality of RF antennas is provided on an article of interest, with each antenna having a non-linear element that is resonant at one of a plurality of different frequencies. The Examiner further stated, however, that Fancher does not disclose interrogating the one RF antenna with RF energy of a first frequency, converting the interrogating RF energy into reflected RF energy of a different frequency, sensing the reflected RF energy, and on the basis of a difference between the first frequency and the different frequency determining if a specific antenna is present. The Examiner asserts, however, that these missing elements are disclosed by Gila et al. The Applicants respectfully disagree.

Gila et al. discloses a system for identifying objects by way of an *identification code* that is impressed on a data medium 2 provided on an object that is read by a reading section 1. As seen in Figure 1 of Gila et al., the reading section 1 contains an RF transmitter 11, a transmitting antenna 12 connected to the RF transmitter 11, and a receiving station 13 having a receiving antenna 14. As also seen in Figure 1 of Gila et al., the data medium 2 has a reflector antenna 21. In operation, the reading section 1 transmits RF signals through the transmitting antenna 12. If the frequency of the transmitted RF signals matches a characteristic frequency of the reflector antenna 21 of the data medium 2, the RF signals are absorbed. If, however, the frequency of the transmitted RF signals does *not* match a characteristic frequency of the reflector antenna 21, a reflected signal is generated by the reflector antenna 21. The reflected signal is a modulated signal wherein the modulation is determined by a pulse sequence corresponding to the *identification code* that has been previously impressed on the data medium 2. In other words, the identification information or code of the data medium 2 is modulated onto the signal reflected by the reflector antenna 21. The reading section 1 receives the modulated reflected signal, obtains the identification

information or code from the modulated reflected signal, and is able to identify the data medium 2 (and an object with which it may be associated) *based on the obtained identification code*. See Gila et al., col. 4, lines 1-26 and lines 34-43. Contrary to the Examiner's assertion, Gila et al. does not disclose making an identification based on the frequency difference between a first, transmitted frequency and a second, reflected frequency.

Thus, based on the differences described above, neither the Fancher nor the Gila et al. reference discloses all of the limitations of claims 1 and 15. In addition, as a result of these differences, the combination of Fancher and Gila et al., as proposed by the Examiner, would similarly not include all of the limitations of claims 1 and 15. Specifically, that combination would not yield a system as recited in claims 1 and 15 wherein *each RF antenna is resonant at one of the plurality of different RF frequencies* and wherein on the basis of *the difference between the first frequency of the interrogating energy and the different frequency of the reflected RF energy*, a determination is made as to which specific antenna is present on said article. See MPEP §2142 ("To establish a *prima facie* case of obviousness ... the prior art reference (or references when combined) must teach or suggest all the claim limitations). Accordingly, Applicants respectfully submit that claims 1 and 15 are allowable over the cited references. In addition, because claims 2-14 and 16-23 depend, directly or indirectly, from claims 1 and 15, they are likewise believed to be allowable over the cited references.

Independent claims 24 and 33 relate to a method and apparatus, respectively, for monitoring an ambient physical condition such as temperature, pressure, humidity, chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, among others. Claim 24 recites steps of "providing an antenna having a non-linear element whose response depends on the physical property being monitored," "converting the interrogating RF energy into reflected RF energy of a different frequency ... dependent on the physical property being monitored," and determining the state of the physical property based on "a difference between said first frequency and said different frequency." Similarly, claim 33 recites an apparatus including "a non-linear element operatively associated with said antenna whose response depends on the physical property being monitored," "a detector for receiving reflected RF energy having a different frequency that is dependent on the physical property being monitored," and "a processor for determining from a difference between said particular frequency and said different frequency the state of the physical property being monitored."

Fancher describes an article surveillance system that employs a label or tag containing a non-linear impedance element, such as a semiconductor diode, connected to a metal antenna loop that is configured to pick up two distinct radio frequency transmissions

displaced on either side of a selected center frequency. The non-linear impedance element connects opposing sides of a closed loop section at one end of the antenna to form a tuned tank circuit having a resonant frequency twice that of the selected center frequency. Both transmitter signals are fed separately to respective radiating antennae located adjacent to a surveillance zone. The two different frequencies picked up by the transponder antenna are mixed by the non-linear impedance element, causing the tank circuit to resonate at a single higher frequency equal to their sum, which is double the center frequency; that resonant frequency is reradiated to be picked up by a receiver antenna or antennae suitably placed with respect to the surveillance zone to be detected by a very narrow band receiver responsive to the sum frequency. Thus, the purpose of the system described in Fancher is to detect the presence of the label or tag in the surveillance zone, and, as a result, no sensing of any ambient physical conditions, such as temperature, pressure, humidity, chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, or the like, is disclosed. Fancher thus does not disclose a method or apparatus for monitoring ambient physical conditions, and in particular includes no teaching or suggestion of determining *the state of a physical property that is being monitored based on a difference between a first, transmitted frequency and a different, reflected frequency.*

Similarly, in Gila et al., no sensing of any ambient physical conditions, such as temperature, pressure, humidity, chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, or the like, is disclosed. Instead, as noted elsewhere herein, Gila et al. discloses a system for identifying objects by receiving a modulated signal transmitted by a reflector antenna of a data medium and extracting an identification code from the received modulated signal. Thus, like Fancher, Gila et al. does not disclose a method or apparatus for monitoring ambient physical conditions, and in particular includes no teaching or suggestion of determining *the state of a physical property that is being monitored based on a difference between a first, transmitted frequency and a different, reflected frequency.*

Accordingly, based on the above, it is clear that neither Fancher not Gila et al., alone or in combination, discloses a method step of determining the state of the physical property based on "a difference between said first frequency and said different frequency" as recited in claim 24 or "a processor for determining from a difference between said particular frequency and said different frequency the state of the physical property being monitored" as recited in claim 33. Applicants therefore respectfully submit that claims 24 and 33 are allowable over the cited references. In addition, because claims 25-32 and 34-41 depend,

directly or indirectly, from claims 24 and 33, they are likewise believed to be allowable over the cited references.

With regard to claim 12, which recites a second non-linear element cooperating with the non-linear element to provide a variable readout as a function of a specific *physical condition*, it is respectfully submitted that, contrary to the Examiner's assertion (the Examiner cites to col. 9, lines 6-13 of Fancher), Fancher does *not* disclose a *second non-linear* element. Claims 22, 31 and 40 recite similar limitations. The section of Fancher cited by the Examiner merely states "In operation, when both transmitted signals f_1 and f_2 are received by the transponder antenna loop 38, they are mixed through the non-linear impedance effect of the semiconductor diode 36 to initiate tank circuit oscillation at its resonant frequency, which is equal to the sume [sic] of the f_1 and f_2 frequencies. Increased mixing and overall transponder efficiency is enhanced through use of a Schottky diode." Thus, only one non-linear device (a diode) is described, which may be a Schottky diode. Applicants thus submit that claims 12, 22, 31 and 40 are allowable for this additional reason.

SUMMARY AND CONCLUSION

It is respectfully submitted that the foregoing analysis establishes the fact that Applicants' independent claims 1, 15, 24 and 33 are patentably distinct from the applied art and that claims 1-41 are in proper form for the issuance of a Notice of Allowance. Such action is respectfully requested at an early date.

Respectfully submitted,

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